

REMARKS

Claims 1-24 are pending in the application. Claims 1-24 stand rejected. Claims 1, 13 and 21 have been amended. In view of the amendments to the claims and the following remarks, Applicant respectfully requests the rejections be withdrawn and the claims allowed.

Claims 13-20 are objected to for various informalities. Specifically, claim 13 is objected to for informalities, and claims 14-20 are objected to as being dependent upon claim 13. Claim 13 has been amended as suggested by the Examiner to overcome the objection. Accordingly, the objection of claims 13-20 should be withdrawn.

Claims 13-15 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,137,100 to Fossum et al. ("Fossum '100"). The rejection is respectfully traversed.

Claim 13 recites a CMOS color pixel assembly. The pixel assembly includes a plurality of macro pixels. Each macro pixel includes "at least three color pixel elements of substantially equal pixel area, each color pixel element including a photoreceptor having a device geometry, responsive to receiving light, to generate an output signal indicative of an amount of light photons received, the device geometry of each photoreceptor comprising a size, a shape, a depth and a position." The color pixel elements each include "a responsivity to light that is a function of the ... geometry of the photoreceptor." Because Fossum '100 fails to teach at least these elements of claim 13, claim 13 is allowable over Fossum '100.

Fossum '100 discloses a macro pixel wherein the responsivity to light is dependent upon the size of the collection area and the size of the photodiode of each color pixel element. Fossum '100, col. 2, lines 38-44; col. 3, lines 38-51. However,

Fossum '100 fails to disclose how other factors inherent to the device geometry of a photoreceptor may be varied to achieve a desired responsivity to light. Claim 13 recites that each color pixel element includes "a responsivity to light that is a function of the ... geometry of the photoreceptor," and the geometry of the photoreceptor comprises "a size, a shape, a depth and a position." Because Fossum '100 fails to show how a color pixel element's responsivity to light may be varied by varying the shape, depth and position of the photoreceptor, claim 13 is allowable over Fossum '100. Claims 14 and 15, which depend from claim 13, are also allowable for at least the same reason.

For at least these reasons, claims 13-15 are allowable. Applicant respectfully requests the rejection be withdrawn.

Claims 1, 4-7, 10-12 and 19-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossum '100 in view of U.S. Patent No. 5,119,181 to Perregaux et al. ("Perregaux"). The rejection is respectfully traversed.

Claim 1 recites a macro pixel that includes "at least two color pixel elements of substantially equal pixel area, each color pixel element including a photoreceptor having a device geometry, responsive to receiving light, to generate an output signal indicative of an amount of light photons received, the device geometry of each photoreceptor comprising a size, a shape, a depth and a position." The color pixel elements each have "a responsivity to ... light that is a function of the ... geometry" of the respective photoreceptor, the geometries of each photoreceptor being different. Because neither Fossum '100 nor Perregaux, individually or combined, teach at least these elements of claim 1, claim 1 is allowable.

As explained above, Fossum '100 fails to teach that a color pixel element's responsivity to light may be varied by varying the shape, depth and position of the

photoreceptor. Fossum '100 teaches only that a color pixel element's responsivity to light may be varied by altering the sizes of the collection area and the photodiode of each color pixel element. Fossum '100, col. 2, lines 38-44; col. 3, lines 38-51.

Perregaux also fails to remedy the shortcomings of Fossum '100. Although Perregaux does teach that a photodiode size and shape may be varied to alter the spatial sensitivity of the photodiode, Perregaux fails to teach that the depth and position of the photodiode may also be varied. Perregaux, col. 5, lines 25-32, 60-62. Thus, because neither Fossum '100 nor Perregaux teach each recited element of claim 1, claim 1 is allowable over the cited combination. Claims 4-7 and 10-12, which depend from claim 1, are also allowable for at least the same reason.

Claims 19 and 20 depend from claim 13. As explained above, Fossum '100 fails to render claim 13 unpatentable because Fossum '100 fails to teach that the shape, depth and position of a photodiode may be varied to alter the responsivity of a color pixel element to light. Also explained above, Perregaux fails to teach that the depth and position of a photodiode may be varied to alter the spatial sensitivity of the photodiode. Because neither Fossum '100 nor Perregaux, individually or combined, teach at least these limitations of claims 19 and 20, claims 19 and 20 are allowable over the combination of Fossum '100 and Perregaux.

Claim 21 recites a color pixel assembly including at least one macro pixel. The at least one macro pixel includes "at least three color pixel elements having equal pixel areas, each color pixel element including a photoreceptor having a device geometry and at least one switch configured and arranged to selectively change the device geometry, responsive to receiving light, to generate an output signal indicative of an amount of light photons received, the device geometry of each photoreceptor comprising a size, a shape, a depth and a position." Each color pixel element has "a

responsivity to light that is a function of the ... geometry of the photoreceptor, the responsivity of the output signal of the photoreceptor ... being controllable by changing the ... geometry." Because the combination of Fossum '100 and Perregaux fails to teach that the responsivity of the output signal of the photoreceptor is controllable by changing the depth and position of the photoreceptor, as explained above, claim 21 is allowable over the cited combination. Claims 22 and 23, which depend from claim 21, are also allowable for at least the same reasons.

Because the combination of Fossum '100 and Perregaux fail to teach each limitation recited by claims 1, 4-7, 10-12 and 19-23, claims 1, 4-7, 10-12 and 19-23 are allowable over the cited combination. Applicant respectfully requests that the rejection be withdrawn and the claims allowed.

Claims 2 and 3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossum '100 in view of Perregaux, and further in view of U.S. Patent No. 6,040,592 to McDaniel et al. ("McDaniel"). The rejection is respectfully traversed.

Claims 2 and 3 depend from claim 1. As explained above, neither Fossum '100 nor Perregaux, individually or combined, render claim 1 unpatentable. Furthermore, McDaniel, which is relied upon by the Examiner to teach an n+ diffusion photodiode, fails to remedy the shortcomings of the Fossum '100 and Perregaux combination. Specifically, McDaniel does not teach or suggest that a photodiode depth and position may be altered to alter the photodiode responsivity. Because the combination of Fossum '100, Perregaux and McDaniel fails to render unpatentable the claim upon which claims 2 and 3 depend, claims 2 and 3 are allowable. The rejection is respectfully requested to be withdrawn.

Claims 8 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossum '100 in view of Perregaux, and further in view of U.S. Patent No. 5,949,483 to Fossum et al. ("Fossum '483"). The rejection is respectfully traversed.

Claims 8 and 9 depend from claim 1. As explained above, neither Fossum '100 nor Perregaux, individually or combined, render claim 1 unpatentable. Fossum '483 also fails to overcome the shortcomings of the Fossum '100 and Perregaux combination. Although Fossum '483 teaches the use of microlenses to focus light onto a color pixel element, Fossum '483 does not teach the altering of a photodiode size, shape, depth and position to alter the photodiode's responsivity. Fossum '483, fig. 5A. Thus, the combination of Fossum '100, Perregaux and Fossum '483 fails to teach each recited element of claims 8 and 9. Applicant respectfully requests that the rejection be withdrawn and the claims allowed.

Claim 16 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossum '100 in view of McDaniel. The rejection is respectfully traversed.

Claim 16 depends from claim 13. As explained before, Fossum '100 does not render claim 13 unpatentable. McDaniel also fails to render claim 13 unpatentable for at least the same reasons as described above in relation to claim 1. Because neither Fossum '100 nor McDaniel, individually or combined, render unpatentable the claim upon which claim 16 depends, claim 16 is allowable. The rejection is respectfully requested to be withdrawn.

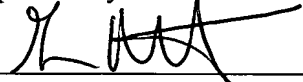
Claims 17 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fossum '100 in view of Fossum '483. The rejection is respectfully traversed.

Claims 17 and 18 depend from claim 13. As explained above, Fossum '100 fails to render claim 13 unpatentable. Fossum '483, relied upon to teach the use of microlenses, fails to remedy the shortcomings of Fossum '100 with regards to claim 13. Because the combination of Fossum '100 and Fossum '483 fail to teach each element and limitation of the claim upon which claims 17 and 18 depend, claims 17 and 18 are allowable. Applicant respectfully requests that the rejection be withdrawn and the claims allowed.

In view of the above amendment, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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